

The Ferns and Fern Allies of the Karst Forests of Bohol Island, Philippines

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ABSTRACT.—We provide the first and only comprehensive list of the ferns and fern allies of Bohol island, Philippines. This compendium is based on collections made from those of Cuming in 1841 to our recent survey of the karst forests of the Rajah Sikatuna Protected Landscape (RSPL) and vicinity during November, 2003 to February 2004. A total of 169 species in 63 genera and 27 families are reported here for the island, of which 91 species are new additions. Twenty-one species are Philippine endemics, five of which are previously known only from types or from very few collections. They are *Ctenitis boholensis*, *C. humilis*, *Pteris whitfordii*, *Antrophyum williamsii*, and *Lomagramma merrillii*. Bohol is the type locality of five fern names, namely, *Ctenitis humilis*, *C. boholensis*, *Cyclosorus glaber* and *Thelypteris seviliana* (= *Pneumatopteris glabra*), *Cyclosorus boholensis* Copel. (= *Sphaerostephanos acrostichoides*), and *Diplazium petiolare*. Two species in the genera *Oleandra* and *Ctenitis* and several specimens of *Selaginella* remain undetermined. Nineteen previously reported species have not been recollected or in some cases, their taxonomic identities are doubtful. Prior to this study, only one fern specimen from Bohol was accessioned at the Philippine National Herbarium (PNH). All historical collections are currently deposited in herbaria in the U.S.A. and Europe. Boholanos have successfully maintained the integrity of the wild populations of ferns, especially those species that are heavily collected in other parts of the Philippines for their ornamental value.

Bohol is one of the least biologically explored islands in the Philippines. In the last century and a half, botanical explorations in Bohol have been few compared to other islands in the country (Amoroso *et al.*, 1995; Barcelona, 2002, 2003a and b, 2004; Copeland 1908, 1910; Hatusima, 1966; Iwatsuki and Price, 1977; Merrill, 1908). Historical collections include those of Cuming (in 1841), McGregor (in 1906 and 1910), Bartsch (Tagbilaran, in 1908), Ramos (Bilar, Dimiao, Sevilla, and Valencia, in 1923), Konyo and Edaño (in 1957), and Co (Dagohoy, Danao, Inabanga and Pilar, in 1995). All combined, these explorations have resulted in a little more than a hundred pteridophyte collection numbers, of which Ramos contributed more than 80 percent representing 75 species. Nearly all of these historical collections are now deposited in herbaria in the United States and Europe. Whereas Co's collections are deposited at PNH, University of the Philippines-Diliman, only one specimen from Bohol was accessioned at the Philippine National Herbarium (PNH) prior to the present study.

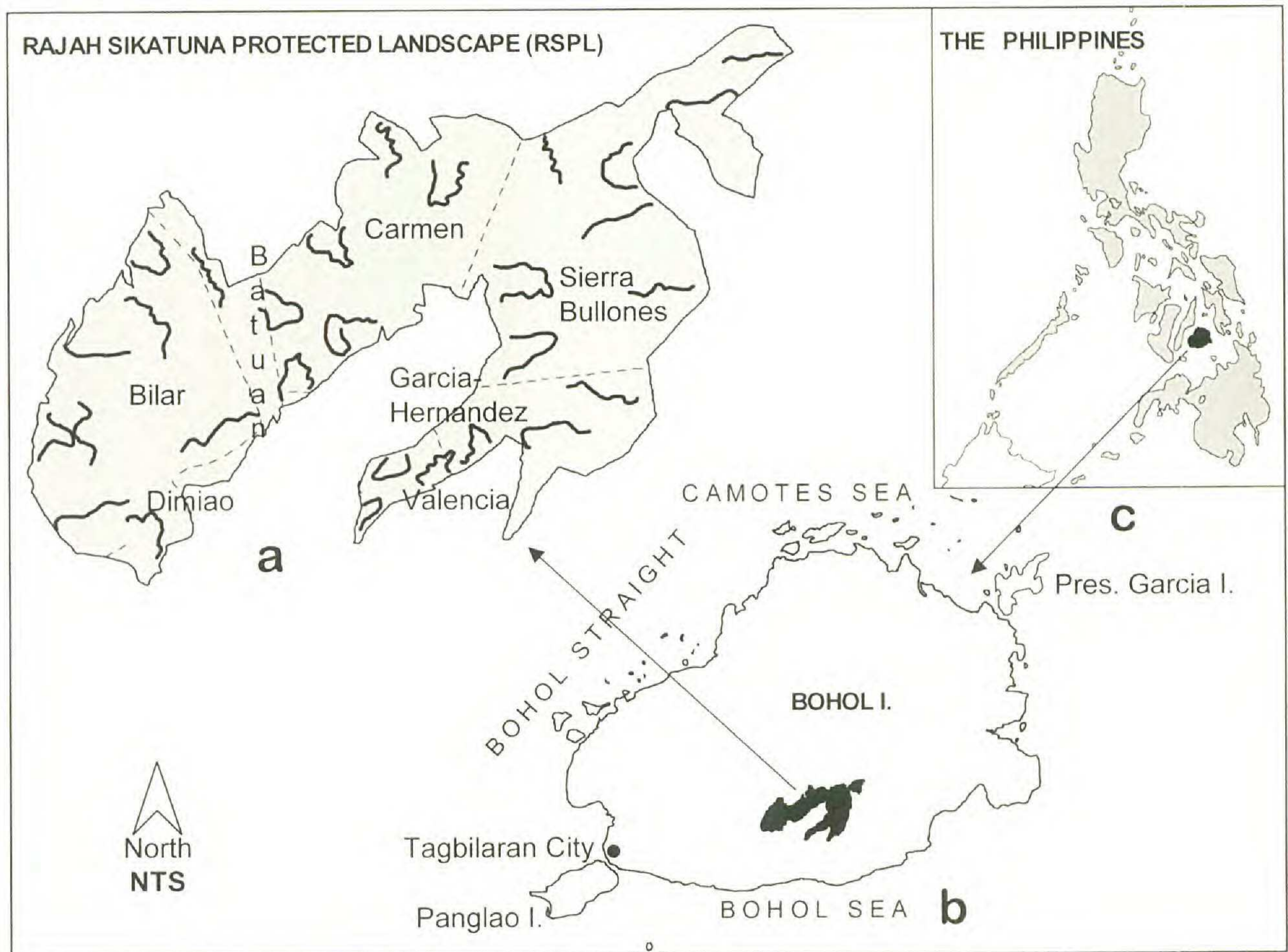


FIG. 1. Map of Rajah Sikatuna Protected Landscape (RSPL), Bohol Island, Philippines showing the Biodiversity Monitoring Trails (BMS) sampled. Map modified by the first author from the University of San Carlos/GIS-WRC Center and SWCF, 2001.

The Rajah Sikatuna Protected Landscape (RSPL) is one of the many protected areas so far established on Bohol. It encompasses forested karst topography characterized by dogtoothed terrain with many caves and sinkholes. The forest canopy is multi-layered with trees reaching 20m tall. The canopy includes members of the Dipterocarpaceae, Moraceae (*Ficus* spp.), and Meliaceae, among others. Some regions of the preserve have been reforested with *Gmelina arborea* and *Swietenia macrophylla*. The numerous canopy vines and lianas include the scrambling bamboos and species of *Strongylodon* and *Tetrastigma*. Some species of the latter genus are hosts to parasitic *Rafflesia*. Ferns and fern allies are dominant components of the understory and the epiphytic flora, especially in high-moisture areas. Unique species associations are evident in different microhabitats and on different substrates.

MATERIAL AND METHODS

During Nov 2003 and from Jan to Feb 2004, a reconnaissance survey and photo-documentation of RSPL (Fig. 1) was conducted. Following these activities, ferns and fern allies were collected from the limestone (karst)

TABLE 1. Survey localities for ferns and fern allies at Rajah Sikatuna Protected Landscape (RSPL) and vicinity, Bohol Island Province.

Municipality (= Town)	Barangay (= Barrio)	Elevation (m)
Bilar	Bugang Sur	330–365
	Cansumbol	300–370
	Riverside	330–560
	Yanaya	330–560
Garcia-Hernandez	Datag	600–703
	Cambuyo	600–703
Guindulman	Biabas	560–585
	Bugsoc	390–600
Sierra Bullones	Lataban	620–720
	Nan-od	530–623
Valencia	Anonang	445–525
	Botong	575–600
	Canlambong	390–465
	La Victoria	480–600
	Lantang	470–520
	Marawis	390–465
	Maubo	570–600
	Omjon	510–546

forests and vouchers deposited in PNH. Collections and surveys were conducted at the localities listed in Table 1.

Although these 18 localities represent only 10% or less of the total land area of RSPL and almost a negligible portion of the island of Bohol, they substantially represent the unique microhabitats within the karst landscape that characterize much of the island. Collections within RSPL were made in forest interiors within close proximity of the pre-established Biodiversity Monitoring System (BMS) trails.

RESULTS

A total of 169 species in 63 genera and 27 families of ferns and fern allies have been initially identified to occur in Bohol (Table 2). Twenty-one of these species are Philippine endemics and two are local endemics. Our recent survey has added 91 new species records for Bohol since botanical explorations in this island started in 1841. We also recollected rare local endemics that have been known either only from the types or from very few herbarium collections. One such rarity is *Ctenitis humilis* Holtt., which was first collected by Ramos in Bohol (without exact locality) in 1923 and later (1935) was also found in Mindoro by Bartlett. The identity of *C. humilis* as distinct from *C. boholensis* has been questioned: "... *C. humilis* maybe a dwarf habitat-form of *C. boholensis*; further collections are needed ..." (Holttum, 1991, p. 31). *Ctenitis boholensis* Holtt., an apparent Bohol island endemic, is known only from the type (*Ramos BS42983*, K and UC) and two other

TABLE 2. Ferns and Fern Allies of Bohol Island, Philippines (1841–2004). (* - new record for Bohol; † - not recollected). (1 - Bilar; 2 - Dimiao; 3 - Garcia-Hernandez; 4 - Guindulman; 5 - Sevilla; 6 - Sierra Bullones; 7 - Tagbilaran; 8 - Valencia) N.B.: *Barcelona et al.* collections are at PNH.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
ADIANTACEAE			
<i>Adiantum caudatum</i> L.*	<i>Barcelona et al.</i> 2633	Epilithic.	Limestone walls in exposed areas. 445–525m. Infrequent. (8)
<i>A. malesianum</i> Ghatak	<i>Barcelona et al.</i> 2410	Epilithic.	Limestone walls in exposed areas. 330–560m. Infrequent. (1)
<i>A. philippense</i> L.*	<i>Barcelona et al.</i> 2645	Epilithic.	Karst forest interior. 445–525m. Seen only once. (8)
<i>A. tenerum</i> Sw.*	<i>Barcelona et al.</i> 2425	Terrestrial.	Karst forest margin. 330–560m. Locally common. (1)
<i>Pityrogramma calomelanos</i> (L.) Link*	not collected	Terrestrial.	Disturbed, exposed areas. Weedy. (1)
<i>Taenitis cordata</i> (Gaud.) Holtt.	<i>Barcelona et al.</i> 2618	Terrestrial.	Dry karst forest. (2; 8). 390–465m. Rare.
ASPLENIACEAE			
<i>Asplenium affine</i> Sw.	<i>Barcelona et al.</i> 2500	Epiphytic.	Karst forest in shaded areas. 543–586m. Frequent. (1; 6)
<i>A. caudatum</i> G. Forst.	<i>Barcelona et al.</i> 2634	Terrestrial.	Karst forest margins. 330–560m. Infrequent. (1; 8)
<i>A. cymbifolium</i> Christ*	<i>Barcelona et al.</i> 2670	Epiphytic.	Karst forest interior. 600–703m. Infrequent. (3)
<i>A. epiphyticum</i> Copel.	<i>Barcelona et al.</i> 2580	Terrestrial then twining on saplings.	Karst forest and margins. 330–560m. Frequent. (1; 8)
<i>A. lobulatum</i> Mett. ex Kuhn*	<i>Barcelona et al.</i> 2461	Terrestrial.	Karst forest, along trails. (330–560m). Frequent. (1)
<i>A. musifolium</i> Mett.*	<i>Barcelona et al.</i> 2458	Epiphytic.	Karst forest interior. Also cultivated. Frequent. 330–560m. (1; 8)
<i>A. nidus</i> L.*	not collected	Terrestrial, epiphytic, and epilithic.	Terrestrial, epilithic, and epiphytic. Karst forest interior. Infrequent.
<i>A. pellucidum</i> Lam.	<i>Barcelona et al.</i> 2508	Epiphytic.	Karst forest interior. 530–703m. Infrequent. (1; 3; 6)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>A. persicifolium</i> J. Sm. ex Mett.	<i>Barcelona et al. 2512</i>	Terrestrial and twining on saplings.	Karst forest interior. 330–586m. Frequent. (1; 6; 8)
<i>A. phyllitidis</i> Don*	<i>Barcelona et al. 2386</i>	Epilithic or epiphytic.	Karst forest interior. 330–720m. Locally frequent. (1; 6; 8)
<i>A. polyodon</i> G. Forst.	<i>Barcelona et al. 2453</i>	Terrestrial, epilithic, or epiphytic.	Karst forest interior and margins. 330–600m. Frequent. (1; 6; 8; 7)
<i>A. scandens</i> (J. Sm. ex Fée) Mett.	<i>Barcelona et al. 2450</i>	Terrestrial and climbing.	Karst forest interior. Moist, waterlogged area. 330–560m. Rare. (1)
<i>A. subnormale</i> Copel.	<i>Barcelona et al. 2473</i>	Terrestrial.	Moist or waterlogged areas. 330–720m. Infrequent. (1; 6; 8)
<i>A. tenerum</i> G. Forst.	<i>Barcelona et al. 2449</i>	Epiphytic.	Moist or waterlogged area. 330–586m. Frequent. (1; 6; 8)
<i>A. unilaterale</i> Lam.	<i>Barcelona et al. 2446</i>	Terrestrial.	Moist or waterlogged areas. Infrequent. (1; 2; 8)
<i>A. vittaeforme</i> Cav.	<i>Barcelona et al. 2524</i>	Epiphytic.	Karst forest interior. 330–703m. Infrequent. (1; 3; 6; 2)
AZOLLACEAE			
<i>Azolla pinnata</i> R. Br.*	<i>Barcelona et al. 2614a</i>	Floating.	Rice paddies below limestone forest. 390–465m. Common. (8)
BLECHNACEAE			
<i>Blechnum orientale</i> L.*	not collected	Terrestrial.	Exposed areas, eroded roadcuts. 530–623m. Frequent. (6)
CYATHEACEAE			
<i>Cyathea contaminans</i> (Wall. ex Hook.) Copel.*	<i>Barcelona et al. 2553</i>	Terrestrial.	Karst forest interior and exposed, disturbed areas. 300–465m. Rare. (1; 8)
<i>Cyathea</i> sp.*	<i>Barcelona et al. 2521</i>	Terrestrial.	Karst forest interior. 543–586m. Frequent. (6)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
DAVALLIACEAE			
<i>Davallia denticulata</i> (Burm. f.) Kuhn var. <i>denticulata</i> *	<i>Barcelona et al.</i> 2682	Terrestrial or epiphytic.	Reforested karst forests. 330–703m. Infrequent. (1; 3)
<i>D. divaricata</i> Blume	<i>Barcelona et al.</i> 2536	Terrestrial, epilithic, or epiphytic.	Karst forest interior. 480–720m. Infrequent. (6; 8)
<i>D. falcinella</i> (J. Sm.) C. Presl†	<i>Ramos BS42974</i> (UC)		(1)
<i>D. pectinata</i> J. Sm.*	<i>Barcelona et al.</i> 2632	Low-climbing epiphyte.	Summit of a very dry karst hill. ca. 525m. Seen only once. (8)
<i>D. repens</i> (L. f.) Kuhn†	<i>Ramos BS42970,</i> <i>BS43002</i> (UC)	Epiphytic.	(1)
<i>D. solida</i> (G. Forst.) Sw.*	<i>Barcelona et al.</i> 2556	Epiphytic.	Karst forest interior. 300–370m. Infrequent. (1)
<i>D. trichomanoides</i> Blume var. <i>lorrainii</i> (Hance) Holtt.	<i>Barcelona et al.</i> 2554	Epiphytic.	Karst forest interior. 300–370m. Infrequent. (6)
<i>Davallodes hirsutum</i> (C. Presl) Copel.*	<i>Barcelona et al.</i> 2680	Epiphytic.	Karst forest interior. 530–703m. Infrequent. (3;6)
DENNSTAEDTIACEAE			
<i>Microlepia speluncae</i> (L.) Moore	<i>Barcelona et al.</i> 2441	Terrestrial.	Karst forest margins, exposed thickets, abandoned farm. 543–623m. Frequent. (1; 6; 8)
<i>Pteridium aquilinum</i> (L.) Kuhn var. <i>wrightianum</i> (Wall. ex Agardh) Tryon [= <i>P. caudatum</i> (L.) Maxon?]	<i>Barcelona et al.</i> 2552	Terrestrial.	Disturbed, eroded, clayey/loamy (not limestone-derived) soil. 530–623m. Locally dominant. (2; 6)
EQUISETACEAE			
<i>Equisetum ramosissimum</i> Desf. ssp. <i>debile</i> (Vaucher) Hauke	<i>Barcelona et al.</i> 2654	Terrestrial.	Along Bugsoc River. 390–600m. Locally common. (1; 6)
GLEICHENIACEAE			
<i>Dicranopteris linearis</i> (Burm. f.) Underw. var. <i>subspeciosa</i> Holtt.*	<i>Barcelona et al.</i> 2393	Scrambling.	Roadcuts, exposed areas. Not limestone-derived soil. Infrequent. 560–585m. (4)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>D. linearis</i> (Burm. f.) Underw. var.?*	<i>Barcelona et al.</i> 2394	Scrambling.	Roadcuts, exposed areas. Not limestone-derived soil. Infrequent. 560–585m. (4)
HYMENOPHYLLACEAE			
<i>Cephalomanes atrovirens</i> C. Presl*	<i>Barcelona et al.</i> 2571	Terrestrial or epiphytic.	In moist, shaded, waterlogged areas. 330–703m. Frequent. (1; 3; 8; 2)
<i>Crepidomanes brevipes</i> (C. Presl) Copel*.	<i>Barcelona et al.</i> 2511	Climbing epiphytes.	Karst forest interior. 330–720m. Infrequent. (1; 3; 6; 8)
<i>C. humile</i> (G. Forst.) Bosch*	<i>Barcelona et al.</i> 2373	Epiphytic.	Karst forest interior. (330–560m). Infrequent. (1)
<i>Hymenophyllum polyanthos</i> (Sw.) Sw.†	Ramos BS43996, BS43043 (UC)	Epiphytic.	(1)
<i>H. serrulatum</i> (C. Presl) C. Chr.†	Ramos BS43042 (UC, US)	Epiphytic.	(8)
LINDSAEACEAE			
<i>Lindsaea ensifolia</i> Sw. ssp. <i>ensifolia</i> *	<i>Barcelona et al.</i> 2616	Terrestrial.	Karst forest interior. 390–600m. Rare. (6; 8)
<i>L. repens</i> (Bory) Thwaites var. <i>pectinata</i> (Blume) Mett. ex Kuhn forma <i>angusta</i> (Copel.) Kramer*	<i>Barcelona et al.</i> 2541	Epiphytic.	Karst forest interior. 330–703m. Rare. (1; 3; 6)
<i>Sphenomeris retusa</i> (Cav.) Maxon*	<i>Barcelona et al.</i> 2396	Terrestrial.	<i>Pteridium aquilinum</i> -dominated area in moist, non-limestone- derived soil. 560–585m. Rare. (4)
LOMARIOPSISACEAE			
<i>Bolbitis heteroclita</i> (C. Presl) Ching*	<i>Barcelona et al.</i> 2514	Terrestrial, climbing, epiphytic, or epilithic.	Karst forest interior. 330–720m. In moist areas. Common. (1; 6; 8)
<i>Lomagramma copelandii</i> Holtt.†	Ramos BS42972 (UC)	Climbing or epiphytic.	Endemic. (1)
<i>L. merrillii</i> Holtt.*	<i>Barcelona et al.</i> 2389	Climbing.	Endemic. Karst forest interior. 620–720m. Rare. (6)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>L. pteroides</i> J. Sm.*	<i>Barcelona et al. 2528</i>	Climbing.	Endemic. Karst forest interior. 510–546m. Frequent. (3; 6; 8)
<i>Lomariopsis lineata</i> (C. Presl) Holttt.*	<i>Barcelona et al. 2482</i>	Climbing.	Karst forest interior. 330–560m. Infrequent. (1)
<i>Teratophyllum aculeatum</i> (Blume) Mett. ex Kuhn*	<i>Barcelona et al. 2693</i>	Climbing or epiphytic.	Karst forest edge. 570–720m. Rare. (3; 6; 8)
LOXOGRAMMACEAE			
<i>Loxogramme avenia</i> (Blume) C. Presl*	<i>Barcelona et al. 2555</i>	Epiphytic.	Karst forest interior. 300–703m. Infrequent. (1; 3; 6; 8)
<i>L. conferta</i> (Copel.) Copel.†	<i>Ramos BS43037 (US)</i>		
LYCOPODIACEAE			
<i>Lycopodium cernuum</i> L.	<i>Barcelona et al. 2395</i>	Terrestrial and scrambling.	Roadcuts and other exposed areas. 560–585m. Infrequent. (4)
MARATTIACEAE			
<i>Angiopteris palmiformis</i> (Cav.) C. Chr.*	<i>Barcelona et al. 2520</i>	Terrestrial.	Karst forest interior and margins. 543–586m. Frequent. (6)
<i>A. pruinosa</i> Kunze*	<i>Barcelona et al. 2491</i>	Terrestrial.	Karst forest interior, shaded. 543–586m. Frequent. (6)
OLEANDRACEAE			
<i>Nephrolepis biserrata</i> (Sw.) Schott	<i>Barcelona et al. 2443</i>	Terrestrial and scrambling.	Exposed thickets, abandoned farms. 330–560m. Frequent. (1; 8)
<i>N. falcata</i> (Cav.) C. Chr.*	<i>Barcelona et al. 2462</i>	Epiphytic.	Moist and shaded karst forest interior. 330–586m. Frequent. (1; 6)
<i>N. multiflora</i> (Roxb.) Jarrett ex Morton*	<i>Barcelona et al. 2589</i>	Terrestrial.	Disturbed, exposed areas. 570–600m. Common. (1; 3; 4; 6; 8; 2; 7)
<i>Oleandra</i> cf. <i>benguetensis</i> Copel.*	<i>Barcelona et al. 2698</i>	Epiphytic.	Karst forest interior. 600–703m. Rare. (3)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
OPHIOGLOSSACEAE			
<i>Ophioglossum petiolatum</i> Hook.*	<i>Barcelona et al. 2376</i>	Terrestrial.	Karst forest margin in clayey substrate. ca. 350m. Rare & seen only once.
PARKERACEAE			
<i>Ceratopteris thalictroides</i> (L.) brongn.*	<i>Barcelona et al. 2505</i>	Partially submerged.	In waterlogged areas. 543–586m. Locally common. (6)
POLYPODIACEAE			
<i>Aglaomorpha acuminata</i> (Willd.) Hovenkamp*	<i>Barcelona et al. 2513</i>	High canopy epiphyte.	Karst forest interior. 543–586m. Rare. (6)
<i>A. heraclea</i> (Kunze) Copel.*	<i>Barcelona et al. 2612</i>	High canopy epiphyte.	Karst forest interior. 543–703m. Infrequent. (3; 6; 8)
<i>Belvisia mucronata</i> (Fée) Copel.*	<i>Barcelona et al. 2527</i>	Epilithic or epiphytic.	Karst forest interior. 543–720m. Infrequent. (6; 8)
<i>Drynaria descensa</i> Copel.*	<i>Barcelona et al. 2679</i>	Epiphytic.	Endemic. Karst forest interior. 600–703m. Infrequent. (3)
<i>D. quercifolia</i> (L.) J. Sm.*	<i>Barcelona et al. 2636</i>	Epiphytic.	Karst forest interior. 445–525m. Common. (8)
<i>D. rigidula</i> (Sw.) Bedd.*	<i>Barcelona et al. 2644</i>	Epiphytic.	Karst forest interior. 445–525m. Rare. (8)
<i>D. sparsisora</i> (Desv.) Moore*	<i>Barcelona et al. 2709</i>	Epiphytic.	Karst Forest margin. 480–703m. Frequent. (3; 8)
<i>Goniophlebium subauriculatum</i> (Blume) C. Presl*	<i>Barcelona et al. 2678</i>	Epiphytic.	Karst forest interior. 600–703m. Locally frequent. (3)
<i>Lecanopteris sinuosa</i> (Wall. ex Hook.) Copel.*	<i>Dolotina et al. s.n.</i> (PNH)	High canopy epiphyte.	Karst forest interior. 600–703m. Seen only once. (3)
<i>Lemmaphyllum accedens</i> (Blume) Donk	<i>Barcelona et al. 2672</i>	Epiphytic.	Karst forest interior. 543–703m. Infrequent. (3; 6)
<i>Lepisorus longifolius</i> (Blume) Holtt.*	<i>Barcelona et al. 2706</i>	Epiphytic.	Karst forest margin. 480–600m. Seen only once. (8)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>Leptochilus macrophyllus</i> (Blume) Noot. var. <i>fluviatilis</i> (Lauterb.) Noot.*	<i>Barcelona et al. 2497</i>	Terrestrial or epilithic.	Karst forest. Flowing, waterlogged forest. 330–586m. Rare. (1; 6)
<i>L. macrophyllus</i> (Blume) Noot. var. <i>macrophyllus</i>	<i>Barcelona et al. 2560</i>	Terrestrial or epilithic.	Karst forest interior. 300–600m. Frequent. (1; 8)
<i>Microsorium commutatum</i> (Blume) Copel.	<i>Barcelona et al. 2685</i>	Epiphytic.	Karst forest interior. 600–703m. Infrequent. (1; 3)
<i>M. heterocarpum</i> (Blume) Ching*	<i>Barcelona et al. 2595</i>	Epilithic.	Karst forest interior. 570–703m. Frequent. (3; 8)
<i>M. longissimum</i> Fée	<i>Barcelona et al. 2495</i>	Epiphytic.	Moist, shaded forest. 330–586m. Common. (1; 6)
<i>M. membranifolium</i> (R. Br.) Ching*	<i>Barcelona et al. 2557</i>	Terrestrial or low epiphyte.	Karst forest interior. 300–465m. Frequent. (1; 8)
<i>M. monstrosus</i> (Copel.) Copel.	<i>Barcelona et al. 2666</i>	Epiphytic and epilithic.	Endemic. Karst forest interior. 390–703m. Infrequent. (2; 3; 8)
<i>M. punctatum</i> (Blume) Copel.	<i>Barcelona et al. 2523</i>	Terrestrial or epiphytic.	Karst forest interior and disturbed areas. 330–703m. Frequent. (1; 3; 6)
<i>M. rubidum</i> (Kunze) Copel.	<i>Barcelona et al. 2487</i>	Terrestrial.	Exposed thickets, abandoned farm. 330–560m. Rare. (1)
<i>M. samarense</i> (J. Sm. ex C. Presl) Bosman*	<i>Barcelona et al. 2641</i>	Epiphytic, climbing, or epilithic.	Endemic. Karst forest interior. 445–525m. Locally frequent but only population seen. (8)
<i>M. scolopendria</i> (Burm.f) Copel.	<i>Barcelona et al. 2444</i>	Terrestrial.	Exposed thickets such as abandoned farms. 330–560m. Infrequent. (1)
<i>M. zippelii</i> (Blume) Ching*	<i>Barcelona et al. 2646</i>	Epilithic?	Karst forest interior. 575–600m. (8)
<i>Platyserium coronarium</i> (König. ex Müller) Desv.*	<i>Barcelona et al. 2624</i>	High canopy epiphyte.	Karst forest interior. 390–465m. Rare and seen only once. (8)
<i>Pyrrosia lanceolata</i> (L.) Farw.	<i>Barcelona et al. 2455</i>	Epiphytic on coconut tree.	Disturbed, exposed areas. 330–560m. Infrequent. (1)
<i>P. longifolia</i> (Burm. f.) C.V. Morton*	<i>Barcelona et al. 2629</i>	Epiphytic.	Karst forest interior and margins. 390–465m. Infrequent. (8)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>P. nummularifolia</i> (Sw.) Ching†	Ramos BS42994 (US)	Epiphytic?	
<i>P. piloselloides</i> (L.) M.G. Price†	McGregor BS1268 (MICH)	Epiphytic?	
<i>P. splendens</i> (C. Presl) Ching	Barcelona et al. 2575	Epiphytic or epilithic.	Endemic. Karst forest interior and margins. 330–560m. Frequent. (1; 8)
<i>Thylacopteris papillosa</i> (Blume) Kunze ex J. Sm.	Barcelona et al. 2539	Epiphytic.	Karst forest interior. 530–703m. Infrequent. (1; 3; 6)
PSILOACEAE			
<i>Psilotum nudum</i> (L.) Beauv.†	Ramos BS42789	Terrestrial.	(5)
PTERIDACEAE			
<i>Pteris armata</i> C. Presl*	Barcelona et al. 2515	Terrestrial.	Karst forest interior. 330–586m. Locally frequent. (1; 6)
<i>P. ensiformis</i> Burm.	Barcelona et al. 2499	Terrestrial.	Karst forest interior. (543-586m). Frequent. (1; 6)
<i>P. mertensioides</i> Willd.†	Ramos BS43021 (NY, UC)		(1)
<i>P. opaca</i> (C. Presl) J. Sm. ex Fée	Barcelona et al. 2653	Terrestrial.	Along shaded riverbanks. 390–600m. Seen only once. (6)
<i>P. oppositi-pinnata</i> Fée*	Barcelona et al. 2529	Terrestrial.	Karst forest interior. 330–586m. Infrequent. (1; 6)
<i>P. pellucida</i> C. Presl	Barcelona et al. 2615	Terrestrial.	Karst forest margins, interior, and along trails. 330–560m. Infrequent. (1; 8)
<i>P. philippinensis</i> Fée*	Barcelona et al. 2697		Terrestrial. Karst forest interior. 330–703m. Infrequent. (1; 3)
<i>P. tripartita</i> Sw.*	Barcelona et al. 2594	Terrestrial.	Karst forest margins and other disturbed and exposed areas. 570–600m. Common. (8)
<i>P. vittata</i> L.	Barcelona et al. 2464	Terrestrial.	Along roadcuts and other exposed areas. 330–560m. Weedy. (1; 7)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>P. whitfordii</i> Copel.	<i>Barcelona et al.</i> 2591	Terrestrial.	Endemic. Karst forest interior. 570–600m. Infrequent. (1; 8)
SCHIZAEACEAE			
<i>Lygodium auriculatum</i> (Willd.) Alston & Holtt.*	<i>Barcelona et al.</i> 2533	Scrambling.	Karst forest interior and exposed thickets. 543–586m. Common. (6)
<i>L. circinnatum</i> (Burm.) Sw.*	<i>Barcelona et al.</i> 2488	1	Scramblers in exposed thickets such as abandoned farms.
<i>L. flexuosum</i> (L.) Sw.*	<i>Barcelona et al.</i> 2561	1	Scramblers and thicket-forming in forest margins and other disturbed areas.
<i>L. japonicum</i> (Thunb.) Sw.*	<i>Barcelona et al.</i> 2489	1	Scramblers and thicket-forming in forest margins and other disturbed areas.
<i>Schizaea inopinata</i> Selling†	<i>Ramos BS43015</i> (UC)	2	1000 ft. (2)
SELAGINELLACEAE			
<i>Selaginella aristata</i> Spring*	<i>Barcelona et al.</i> 2409	1	Epilithic on limestone walls along roadsides.
<i>S. cupressina</i> (Willd.) Spring	<i>Barcelona et al.</i> 2642	1; 6; 8	Terrestrial. Karst forest interior. Frequent.
<i>S. delicatula</i> (Desv.) Alston*	<i>Barcelona et al.</i> 2429	1	Terrestrial. Karst forest margins. Locally common.
<i>S. engleri</i> Hieron.	<i>Barcelona et al.</i> 2525	1; 6	Terrestrial. Karst forest interior and in waterlogged areas. Frequent.
<i>S. flagellifera</i> W. Bull*	<i>Barcelona et al.</i> 2412	Creeping on rockwall along road.	Karst forest margins or along trailsides. 330–560m. Infrequent. (1)
<i>S. involvens</i> (Sw.) Spring	<i>Ramos BS43012</i> (K, UC)	Terrestrial	(1)
<i>S. llanosii</i> Hieron.	<i>Barcelona et al.</i> 2617	Creeping on limestone wall.	Endemic. Karst forest interior. 330–465m. (1; 8)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
TECTARIACEAE			
<i>Ctenitis boholensis</i> Holtt.†	Ramos BS42983 (TYPE - UC, K), BS42984, BS43023(UC)	Terrestrial.	Bohol Endemic. 1,000 ft. (1; 2)
<i>C. humilis</i> Holtt.	Barcelona et al. 2656	Terrestrial and epilithic.	Endemic. Shaded, clayey riverbanks and on rocks in damp forest. 390–600m. Rare. (6; 8)
<i>C. pallens</i> (Brack.) M. G. Price*	Barcelona et al. 2609	Terrestrial.	Karst forest interior. 570–703m. Infrequent. (3; 8)
<i>C. silvatica</i> Holtt.*	Barcelona et al. 2545	Terrestrial.	Karst forest interior. 530–623m. Infrequent. (3; 6)
<i>Ctenitis</i> sp.	Barcelona et al. 2531	Terrestrial.	Karst forest interior. 543–586m. Infrequent. (6)
<i>Cyclopeltis presliana</i> (J. Sm.) Berkeley	Barcelona et al. 2435	Terrestrial.	Karst forest interior, beneath boulders. 330–623m. Common. (1; 6; 8)
<i>Heterogonium aspidioides</i> C. Presl*	Barcelona et al. 2598	Terrestrial.	Karst forest interior. Waterlogged, moist, shaded areas. Karst forest interior. 570–600m. Locally common. (8)
<i>H. pinnatum</i> (Copel.) Holtt.*	Barcelona et al. 2604	Terrestrial.	Moist, waterlogged area. Karst forest interior. 330–600m. Frequent. (1; 8)
<i>Pleocnemia irregularis</i> (C. Presl) Holtt.*	Barcelona et al. 2534	Terrestrial.	Karst forest interior. 330–586m. Locally frequent. (1; 6)
<i>P. presliana</i> Holtt.	Barcelona et al. 2418	Terrestrial.	Karst forest interior. 330–560m. Locally frequent. (1)
<i>Psomiocarpa apiifolia</i> C. Presl*	Barcelona et al. 2421	Terrestrial.	Endemic Genus. Karst forest interior. Moist, limestone-derived soils. 330–586m. Locally infrequent. (1; 6; 8)
<i>Pteridrys microtheca</i> (Fée) C. Chr. & Ching†	Ramos BS43025 (UC)	Terrestrial.	(2)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>Tectaria angulata</i> (Willd.) Copel.*	<i>Barcelona et al. 2657</i>	Terrestrial.	Karst forest. Along riverbanks, loamy soil. 575–600m. Seen only in this locality. (6)
<i>T. athyriosora</i> M. G. Price	<i>Barcelona et al. 2627</i>	Terrestrial.	Endemic. Karst forest interior. 330–560m. Infrequent. (1; 8)
<i>T. aurita</i> (Sw.) S. Chandra*	<i>Barcelona et al. 2605</i>	Terrestrial.	Karst forest interior. Waterlogged or moist, shaded areas. 330–600m. Frequent. (1; 6; 8)
<i>T. calcarea</i> Copel.	<i>Barcelona et al. 2558</i>	Terrestrial.	Endemic. Shaded areas such as underneath limestone walls. 330–600m. Infrequent. (1; 8)
<i>T. crenata</i> Cav.	<i>Barcelona et al. 2637</i>	Terrestrial.	Karst forest interior. 445–703m. Locally common. (1; 3; 8)
<i>T. decurrens</i> (C. Presl) Copel.*	<i>Barcelona et al. 2530</i>	Terrestrial or epiphytic.	Karst forest interior. 330–586m. Infrequent. (1; 6)
<i>T. devexa</i> (Kunze ex Mett.) Copel.	<i>Barcelona et al. 2465</i>	Terrestrial.	Karst forest in moist, shaded areas, beneath boulders. 330–720m. Infrequent. (1; 6)
<i>T. dissecta</i> (G. Forst.) Lellinger	<i>Barcelona et al. 2607</i>	Terrestrial.	Karst forest margins. 330–703m. Infrequent. (1; 3; 8)
<i>T. lobbii</i> (Hook.) Copel. var. <i>lobbii</i> †	<i>Ramos BS43041</i> (GH, MICH, UC)	Terrestrial?	Sevilla River. 1,000 ft. (5)
<i>T. melanocaula</i> (Blume) Copel.*	<i>Barcelona et al. 2661</i>	Terrestrial.	Karst forest interior. 575–600m. Infrequent. (6)
<i>T. ramosii</i> (Copel.) Holtt.	<i>Barcelona et al. 2572</i>	Terrestrial.	Endemic. Karst forest interior. 330–560m. Infrequent. (1; 2; 8)
<i>Tectaria cf. villosa</i> Holtt.*	<i>Barcelona et al. 2613</i>	Terrestrial.	Karst forest interior. Waterlogged areas. 390–465m. Rare. (8)
THELYPTERIDACEAE			
<i>Amphineuron immersum</i> (Blume) Holtt.	<i>Barcelona et al. 2551</i>	Terrestrial.	Karst forest interior. 530–703m. Infrequent. (1; 3; 6; 8)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>A. terminans</i> (Hook.) Holtt.*	<i>Barcelona et al. 2457</i>	Terrestrial.	Limestone-derived soil and swampy sinkholes. 330–586m. Infrequent. (1; 6; 8)
<i>Chingia ferox</i> (Blume) Holtt.	<i>Barcelona et al. 2651</i>	Terrestrial.	Along banks of Bugsoc River. 575–600m. Rare. (2; 6)
<i>Christella parasitica</i> (L.) Lév.*	<i>Barcelona et al. 2619</i>	Terrestrial.	Karst forest interior and margins. 390–465m. Infrequent. (8)
<i>Macrothelypteris torresiana</i> (Gaud.) Ching	<i>Barcelona et al. 2608</i>	Terrestrial.	Exposed thickets and trails. 390–600m. Frequent. (1; 8)
<i>Pneumatopteris glabra</i> (Copel.) Holtt.	<i>Barcelona et al. 2652</i>	Terrestrial.	Endemic. Along shaded riverbanks. 300–600m. (6; 5)
<i>P. laevis</i> (Mett.) Holtt*.	<i>Barcelona et al. 2683</i>	Terrestrial.	Endemic. Karst forest interior and margins. 600–703m. Infrequent. (1; 3)
<i>P. ligulata</i> (C. Presl) Holtt.*	<i>Barcelona et al. 2565</i>	Terrestrial.	Roadcuts and other exposed areas. 330–560m. Frequent. (1)
<i>P. nitidula</i> (C. Presl) Holtt.*	<i>Barcelona et al. 2610</i>	Terrestrial.	Endemic. Karst forest interior. 570–600m. Infrequent. (8)
<i>Pronephrium asperum</i> (C. Presl) Holtt.*	<i>Barcelona et al. 2400</i>	Terrestrial.	Karst forest interior. Moist, clayey soil. 543–586m. Infrequent. (6)
<i>P. rhombeum</i> (Christ) Holtt.*	<i>Barcelona et al. 2510</i>	Terrestrial.	Karst forest interior. 530–600m. Infrequent. (6)
<i>P. ×xiphioides</i> (Christ) Holtt.*	<i>Barcelona et al. 2509</i>	Terrestrial and epilithic.	Endemic. Karst forest interior and margins. 330–600m. Infrequent. (1; 6; 8)
<i>Sphaerostephanos acrostichoides</i> (Desv.) Holtt.	Ramos BS42990 (BO, G, NY, UC, US); Ramos BS42988 (GH, UC, SING)		600 m. (1)
<i>Sphaerostephanos heterocarpus</i> (Blume) Holtt.*	<i>Barcelona et al. 2426</i>	Terrestrial.	Karst forest margins. 330–560m. Frequent. (1)

TABLE 2. Continued.

FAMILY Species	Representative Vouchers (Herbaria)	Habit	Ecology, Frequency, and Location
<i>S. productus</i> (Kaulf.) Holtt.†	Ramos BS42997 [BM; BO; SING; US]		
<i>S. unitus</i> (L.) Holtt.	Barcelona et al. 2442	Terrestrial.	Disturbed, exposed thickets such as abandoned farms. 330–560m. (1)
VITTARIACEAE			
<i>Antrophyum reticulatum</i> (G. Forst.) Kaulf.*	Barcelona et al. 2516	Epiphytic.	Karst forest interior. 543–586m. Infrequent. (6)
<i>A. sessilifolium</i> (Cav.) Spreng.*	Barcelona et al. 2626	Epiphytic.	Karst forest margins. 330–560m. Infrequent. (1; 8)
<i>A. williamsii</i> Benedict*	Barcelona et al. 2568	Epiphytic.	Endemic. Karst forest interior. 330–365m. Rare. (1; 6)
<i>Vittaria elongata</i> Sw.	Barcelona et al. 2577	Epiphytic.	Karst forest interior. 510–703m. Infrequent. (1; 3; 6; 8)
WOODSIACEAE			
<i>Diplazium esculentum</i> (Retz.) Sw.	not collected		Terrestrial. Weedy in exposed, disturbed areas.
<i>D. maximum</i> (Don) C. Chr.	Barcelona et al. 2599	Terrestrial.	Karst forest interior. Moist, clayey soil. 330–600m. Infrequent. (1; 6; 8)
<i>D. pallidum</i> (Blume) T. Moore*	Barcelona et al. 2507	Terrestrial.	Karst forest interior. Moist, clayey soil. 300–586m. Infrequent. (1; 6)
<i>D. petiolare</i> C. Presl	Barcelona et al. 2526	Terrestrial.	Karst forest interior. Frequent. (1; 6; 8)
<i>D. polypodioides</i> Blume*	Barcelona et al. 2675	Terrestrial.	Karst forest interior. 600–703m. Infrequent. (3)
<i>D. vestitum</i> C. Presl†	Cuming 349 (US)		Endemic.
<i>Diplazium</i> cf. <i>crenatoserratum</i> (Blume) T. Moore†	Ramos BS42993, BS42998 (GH, UC, US)	Terrestrial?	(1; 8)

specimens (*Ramos BS42984*, UC and *Ramos BS43023*, UC) collected in Bilar and Dimiao in 1923.

The island of Bohol is the type locality of four other fern names. *Diplazium petiolare* C. Presl was first collected by Cuming in Bohol in 1841 and described as a new species in 1851. It was also later found in Luzon, Samar, Palawan, and Mindanao. The types of *Cyclosorus glaber* Copel. and *Thelypteris sevillaana* Reed, [both synonyms of *Pneumatopteris glabra* (Copel.) Holtt.], a widespread Philippine endemic, were collected from Sevilla River in Bohol.

Our collections also include range disjunctions for three Philippine endemics, *Antrophyum williamsii* Benedict, *Drynaria descensa* Copel., and *Lomagramma merrillii* Holtt. The type of *Antrophyum williamsii* (*Williams 1579*, US), was collected in Baguio City, Benguet Province, northern Luzon in 1904. Other specimens that are doubtfully attributed to this species were *Elmer 10034* (MO), collected in the Cuernos Mountains in the island of Negros and *Copeland 1117* (cited in Copeland, 1905 as *A. parvulum*). Previously, *Drynaria descensa* was known only from Luzon with one collection (*Williams 1507*, US) from Lake Lanao, Mindanao. Until this survey, *Lomagramma merrillii* had been known only from five collections from Lake Lanao in Mindanao.

We also discovered wild populations of a species of staghorn fern, *Platynerium coronarium* (König. Ex Müller) Desv., a popular ornamental species in the Philippines. Unlike *P. grande*, a Philippine endemic staghorn that had been collected to extinction (i.e. extinct in the wild) for its ornamental value, wild populations of *P. coronarium* can still be found in the Philippines, although these are also vulnerable to extinction due to over collection. Eighteen previously reported species have not been recollected (Table 2).

DISCUSSION AND CONCLUSIONS

This survey provides baseline data for one of the most dominant elements of the understory cover in the limestone forests of Bohol, and particularly for RSPL. It provides new information on species composition and increases our understanding of species associations in these unique habitats. The karst forests of Bohol remain one of the most intact, lowland, old secondary growth examples in the country. Although the total number of species so far identified is seemingly low, the associations of taxa adapted to the limestone substrate is quite unique and is not comparable to the more diverse high elevation montane forests. The genera *Asplenium*, *Selaginella*, *Microsorium*, *Pteris*, and *Tectaria* are the most diverse in species composition. *Asplenium* is the most species-rich, and includes both infrequent, locally common, and habitat-specific taxa. Sterile juvenile plants of *Asplenium scandens*, for instance, were found only in Sitio Duangon in Bilar and nowhere else in RSPL. The epiphytic *Lepisorus longifolius* (Blume) Holtt. is locally common in the forest margin in La Victoria, Valencia but found nowhere else in RSPL. Likewise, the high canopy epiphyte staghorn, *Platynerium coronarium*, was only found in the karst forest of Barangay Marawis, Valencia. The abundance of *Selaginella* (7 species) is quite remarkable in that this genus sometimes constitutes more than 80 percent of the

herbaceous understory cover in some portions of the forest. The apparently low representation of the Hymenophyllaceae (filmy ferns) and the total absence of the Grammitids, two of the most species-rich families in the moist montane forests, indicates a generally dryer environment year round.

We were also able to determine and confirm the ecological and conservation status of some of the noteworthy species of pteridophytes in Bohol especially the endemics and those whose conservation status are indeterminate due to deficient collection and ecological data. For instance, *Ctenitis humilis*, a local endemic known only from two collections from Bohol and Mindoro before this survey, is now known to be rare in its natural habitats, i.e. along a very short strip of a loamy riverbank, on moist boulder in forest interior, and on steep cliffs. *Ctenitis boholensis*, on the other hand, a Bohol Island endemic known only from three collections in Bilar and Dimiao in 1923 has not been rediscovered. Despite their rarity, neither *C. humilis* nor *C. boholensis* is classified in the threatened categories of IUCN. Likewise, *Antrophyum williamsii* Benedict, the type, (*Williams 11579*, US) of which came from Baguio, Benguet Province in northern Luzon, is a new record for Bohol. Specimens doubtfully attributed to this species were collected from Mt. Apo (*Copeland 1117* in Polyp. Phil. 109. 1905) and Cuernos Mountains (*Elmer 10034*, MO and *Elmer 10031*, NY) in Negros a hundred years ago. Previously reported by Copeland (1905) as *A. parvulum*, these specimens may indeed be *A. williamsii*, as Copeland (1961, p. 546) himself mistrusts his previous report because immature or dwarfed individuals of several species may look unlike the species in full development, and more or less resemble each other. We agree with Copeland.

Although collected in sterile condition, another Philippine endemic fern, *Drynaria descensa* Copel., is also a new record for Bohol. Previously, all but one specimen (*Williams 1507*, US from Lanao del Sur in Mindanao) of *D. descensa* have been collected from Luzon. The type is from Muñoz, Nueva Ecija Province in Luzon [*Copeland PPE42* (holotype: MICH; isotypes: B, BM, G, K, L, MU, NY, S, NSW, UC)]. The collection from Bohol therefore indicates that *D. descensa* may have a wider distribution, from Luzon to Mindanao, and not necessarily be a disjunct as the meager collection data suggest. Before our survey, the endemic *Lomagramma merrillii* had been known only from collections from the provinces of Lanao del Sur and Davao del Sur, in Mindanao, hence, the population in Sierra Bullones in Bohol represents the northernmost extension of its range.

Noteworthy non-endemic species have also been collected in Bohol. *Taenitis cordata* (Gaud.) Holtt., a species represented by only a few collections from limestone substrates in the Philippines (e.g. Dimiao, Bohol. 1923, *Ramos BS43013*, MICH, UC & US, and Samar Island. 1971, *Colina 454*, CEBU) was recollected from Barangay Marawis, Valencia. Our collection (*Barcelona et al. 2618*) represents the first specimen of this species at the PNH. Plants of *Lindsaea ensifolia* Sw. ssp. *ensifolia* were found to occur very sparsely in Bugsoc, Sierra Bullones and Marawis, Valencia. Although this subspecies is widely distributed in the world (see Holttum, 1971) and found throughout

Malesia, it is locally rare in the Philippines, only represented by a few collections from Luzon and Sibuyan with the most recent specimen collected in 1950 on Guimaras Island (*Sulit PNH 12622*, MICH). No specimens of this collection or of any other collections of this species were at the PNH.

We were not able to rediscover populations of 17 fern species previously reported in Bohol. *Davallia falcinella* (J. Sm.) C. Presl, a widespread semi-endemic that is also reported from the Marquesas was collected by Ramos in Bilar in 1923. Likewise, *Tectaria lobbii* (Hook.) Copel. is only represented in the Philippines by a single collection of var. *lobbii* from Sevilla River in 1923 (*Ramos BS4301*, GH, MICH, UC); this variety has also been reported from Sarawak in Borneo. *Tectaria lobbii* (Hook.) Copel. var. *denticulata* Holtt. is currently known only from the type collection from Sarawak and *T. lobbii* (Hook.) Copel. var. *allosora* Holtt. has been reported from the Moluccas (Holttum, 1991). On the other hand, *Pteris opaca* (C. Presl) J. Sm. ex Fée, a widely collected semi-endemic (also reported from Celebes) is locally rare in Bohol, having been first collected in Sevilla River in 1923 (*Ramos BS43040*, US). Recently, we found another population of this species in a similar habitat, along the Bugsoc River in Sierra Bullones at 390–400m (*Barcelona et al. 2378*, PNH).

Our recent rediscovery of rare fern endemics in the wild as well as wild populations of species of high ornamental value such as the staghorn *Platynerium coronarium*, *Asplenium* spp., *Drynaria* spp., *Microsorium* spp., and *Lepisorus longifolius*, implies that the karst forests of RSPL and adjacent areas are still considerably pristine. Bohol is one of the few provinces in the Philippines where ferns have not yet been collected on a commercial scale for their aesthetic value.

The presence of many non-governmental organizations (NGOs) in Bohol working on several conservation-related projects does have a significant impact on conservation. The cooperation between the NGOs, the local government units (LGUs), government agencies, local offices of the Department of Environment and Natural Resources (DENR), and the Department of Tourism is admirably incomparable to other parts of the Philippines. Because of this, the *Boholanos* (people of Bohol) have been able to successfully maintain the integrity of their forests. Despite the potential for economic development in the island, Bohol has capitalized on its rich biodiversity and natural geologic wonders (caves and karst hills) for cash sources through ecotourism. In fact, Bohol Island was awarded the coveted “Galing Pook Award” (= “Good Place” Award) in 2004 for its Ecotourism Development Program. This award recognizes local governments in the Philippines that demonstrate excellence in governance.

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LITERATURE CITED

- AMOROSO, V. B., F. M. ACMA and H. P. PAVA. 1995. *Diversity, status, and ecology of pteridophytes in selected forests in Mindanao*. CMU Publications Office, Mindanao. 403pp.
- BARCELONA, J. F. 2002. Philippine pteridophyte collections as a resource for conservation planning. Proceedings of the "International Symposium on the Fern Flora Worldwide: Threats and Responses" sponsored by the British Pteridological Society and IUCN- Species Survival Commission." *Fern Gaz.* 16:307–312.
- BARCELONA, J. F. 2003. The taxonomy and ecology of the pteridophytes of Mt. Iraya & vicinity, Batan Island, Batanes Province, Northern Philippines. Pp. 299–325, in Chandra and Srivastava (eds). *Pteridology in the New Millenium*. Kluwer Academy Publishers. The Netherlands: 299–325.
- BARCELONA, J. F. 2003. Preliminary report on the ferns and ferns allies (pteridophytes) of Mt. Bali-it, Balbalasang-Balbalan National Park, Kalinga, northern Luzon, Philippines. *Sylvatrop*, the Technical Journal of Philippine Ecosystems and Natural Resources 13:81–92.
- BARCELONA, J. F. 2004. Collection and conservation status of pteridophytes in Panay Island, Philippines. *Philipp. Scient.* 41:57–73.
- COPELAND, E. B. 1908. Pteridophytes of the Horn of Negros. *Leaflets of Phil. Bot.* 2:387–425.
- COPELAND, E. B. 1910. The ferns of Mt. Apo. *Leaflets of Phil. Bot.* 3:791–851.
- HATUSIMA, S. 1966. An enumeration of the plants of Batan Island, N Luzon, Philippines. *Mem. Fac. Agr. Kagoshima Univ.* 5:13–70.
- HOLTUM, R. E. 1971. *Lindsaea*-group. *Fl. Males.* I, 3:177–254.
- HOLTUM, R. E. 1991. *Tectaria* group. *Fl. Males.* II, 2(1):1–132.
- IWATSUKI, K. and M. G. PRICE. 1977. The pteridophytes of Mt. Burnay and vicinity, northern Luzon. *Tonan Ajia Kenkyu (Southeast Asian Studies)* 14(4):540–572.
- MERRILL, E. D. 1908. On a collection of plants from the Batanes and Babuyan Islands. *Phil. J. Sci.* 3:385–442.